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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,885	12/16/2003	Takeshi Nishi	07977-121003	4773

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EXAMINER	
NGO, HUYEN LE	
ART UNIT	PAPER NUMBER
2871	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/735,885	NISHI ET AL.	
	Examiner	Art Unit	
	Julie-Huyen L. Ngo	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/28/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Reconsideration

Applicant's request for reconsideration of the finality of the rejection of the last Office action based on the filing date Arakawa reference (US6039893), which was filed on January 22, 1998. This date is after the filing date of the parent application, therefore, it is persuasive and the finality of that action is hereby withdrawn. A new Final rejection is applied with a new reference by *Ishii et al. (US5566010A)* that has a filing date of January 22, 1986, which is before the filing date of the parent application (U.S. Application Serial No. 08/799,985) filed on February 12, 1997.

Response to Argument

Applicant's arguments with respect to new claims 25-28 based on the Response filed on April 28, 2008 have been considered but are moot in view of the new ground(s) of rejection. The reference of ***Arakawa (US6039893***) is now replaced by **Ishii et al. (US5566010A**).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 11-12 and 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohe et al. (US6011606A) in view of **Ishii et al. (US5566010A)** and Yoshizo et al. (JP57-141478).

Ohe et al. discloses (Figs. 1-3) a liquid crystal electro-optical device comprising:

- a pair of substrates (7), at least one of said pair of substrates being transparent;
- a light modulating layer interposed between the pair of substrates, said light modulating layer including nematic liquid crystal
- comb-shaped electrodes for applying an electric field in a direction parallel with the pair of substrates (see figure 1)

wherein a cell thickness d between the pair of substrates is about 4μm (col. 8, lines 50-55), which is within the range of 1μm<d<10μm recited in claim 11.

In the case where the claimed ranges ***"overlap or lie inside ranges disclosed by the prior art***" a prima facie case of obviousness exists. See also In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990). See MPEP § 2144.05.

However, Ohe et al. fail to disclose that their nematic light modulating layer including optical active substance and a dichroic dye.

Ishii et al. teach a liquid crystal electro-optical device comprising guest-host liquid crystal with cell gap less than 10μm (col. 11, linee 9-19) and not using polarizers as recited in claims 25-28.

Yoshizo et al. teach (abstract) the guest-host liquid crystal with mixing an optical active substance and a dichroic dye in a nematic liquid crystal of a light modulating layer for improving in visibility and contrast

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a liquid crystal display device as Ohe et al. disclosed with guest-host liquid crystal with cell gap less than 10μm for high speed response charateristic (col. 11, lines 9-15), as taught by **Ishii et al.**, wherein guest-host liquid crystal including nematic liquid crystal, optical active substance and a dichroic dye for improving in visibility and contrast, as taught by Yoshizo et al.

Claims 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al. (US5694188) in view of Tomio et al. (JP57-117579), Wakita et al. (US5574593), Kobayashi et al (US5305126) and **Ishii et al. (US5566010A)**.

With respect to claims 11-13 and 15, Sano et al. discloses (at least in figs. 1, 7 and 10; col. 1, lines 30-41; col. 3, line 1 to col. 5, line 20) a liquid crystal electro-optical device comprising:

- a pair of substrates 1/17, at least one of said pair of substrates being transparent;

- a light modulating layer interposed between the pair of substrates, said light modulating layer including a guest-host type liquid crystal
- comb-shaped wall electrode 10 (11&12) for applying an electric field in a direction parallel with the pair of substrates (see figures 1, 7, 9 &10)

wherein

- the liquid crystal molecules with guest-host including the dichroic dye molecules aligning in the direction parallel with the substrate/screen by the electric field to obtain a light transmission state (col. 4, line 57- col. 5, line 19).

However, Sano et al. do not clearly disclose that the guest-host type LC is used in their display device and included an optically active substance (claims 11 &12), and wherein the dichroic dye molecules are oriented in different directions around the axis that is perpendicular to the substrates to attain a dark state when the electric field is not applied (claims 14 and 16). Also Sano fails to disclose that a cell thickness d between the pair of substrates is in a range of $1\mu m<d<10\mu m$. At col. 5 lines 20-23, Sano discloses that the contrast becomes insufficient when cell gap less than 15μm if the guest-host without controlled dichroic dye and optical active substance when liquid crystal display is applied low driving voltage. Thus in order to increase contrast, the guest-host must have controlled dichroic dye and optical active substance when cell gap is less than 15μm and applied low voltage.

Tomio et al. teach (abstract) mixing an optical active substance in a guest-host liquid crystal (or cholesteric liquid crystal), which is composed of a nematic liquid crystal with phenylcyclohexyl carbonate containing a dichroic dye as solute for improving display contrast by driving at low voltage.

Moreover, Wakita et al teach (abstract) mixing a trace of chiral dopant as an optically active substance to nematic liquid crystals and certain percent of dichroic dye to form guest host LC type for use in their LC display device to obtain brightness and high contrast.

It is well known in the art for a guest-host type LC to include an optical active substance such as chiral component in the LC material for compensating the performance of the dichroic dyes, which results in a good colored light scattering conditions under applied voltage condition as well as improve the threshold characteristics of the display as well as reducing the hysteresis response, which may become prominent when polarity of the applied voltage is changed, as evidenced by Kobayashi et al US 5305126 (col. 56, lines 40-50). Furthermore, a guest–host type is well known as a bright mode, which does not use a polarizer, (see Sano col. 1, lines 30-41) a guest-hole LC in which a chiral nematic liquid crystal acting as the optical active substance that provides cholesteric/nematic phase transition and dichroic dye, and intensively been developed due to its brightness and high contrast (see Wakita et al col. 1, lines 43-53).

Ishii et al. teach forming a liquid crystal electro-optical device comprising guest-host liquid crystal with cell gap less than 10μm (col. 28 line 67 to col. 29

line 1), which is within the range of 1μm<d<10μm for high speed response charateristic (col. 11 line 9-19).

Therefore, it would have been obvious for one of ordinary skill in the art to realize that Sano et al's guest-host type LC including liquid crystals, an optically active substance (chiral), and a dichroic dye for obtaining brightness and high contrast, as taught by Wakita et al and/or as evidenced by Kobayashi et al. and Wakita et al. and for improving display contrast by driving at low voltage, as taught by Tomio et al.

Furthermore, Sano et al's guest-host type LC would obviously having a cell thickness d between the pair of substrates within the range of 1μm<d<10μm for establishing the display pixel in a dark state at a low voltage and in a bright state at a high voltage, as taught by Ohe et al. since in the case where the claimed ranges ***"overlap or lie inside ranges disclosed by the prior art"*** a prima facie case of obviousness exists. See also In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 2144.05.

Claims 14 and 16:

Since the optical substance (chiral) is added to the nematic liquid crystal device of Sano Sano et al. in view of Tomio et al., Wakita et al., or Kobayashi et al and Ohe et al. to form a cholesteric phase with helical arrangement of directors where the dichroic dye molecules lean on, the dichroic dye molecules are

inherently oriented in different directions around the axis that is perpendicular to the substrates to attain a dark state when the electric field is not applied.

Claims 17-18 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohe et al. (US6011606A) in view of **Ishii et al. (US5566010A)** and Yoshizo et al. (JP57-141478) as applied above to claims 11-12, and further in view of Ohnishi et al. (US5730899).

Ohe et al. fail to disclose the liquid crystal has a spiral pitch p in a range of $1\mu m<p<15\mu m$ as recited in claims 17-18; and has an orientation twist angle θ in a range of $\theta\leq 300°$ as recited in claims 21-22.

Ohnishi et al. teaches (col. 6 lines 28-32, lines 50-54) the liquid crystal has a spiral pitch p in a range of $.2\mu m<p<50\mu m$ and has an orientation twist angle θ in a range of 70°- 300° (abstract, col. 2 lines 55-56 and col. 2 lines 64-65) for reducing view angle dependency of contrast of display color over wide temperature range.

Note that the ranges of the spiral pitch and orientation twist angle in Ohnishi et al.'s liquid crystal overlap the ranges of $1\mu m<p<15\mu m$ and $\theta\leq 300°$ recited in claims 17, 18 and 21& 22. Therefore, the ranges in said claims would have been obvious in view of the ranges disclosed by Ohnishi et al. (See In re Malagari, 499 F.2d 197, 182 USPQ 549 (CCPA 1974)).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal in Ohe et al. in view of Yoshizo et al. liquid crystal display device with a spiral pitch p in a

range of $1\mu m<p<15\mu m$; and with an orientation twist angle θ in a range of $\theta \leq 300°$ for reducing view angle dependency of contrast of display color over wide temperature range, as taught by Ohnishi et al.

Claims 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al. (US5694188) in view of Tomio et al. (JP57-117579), Wakita et al. (US5574593), Kobayashi et al (US5305126) and **Ishii et al. (US5566010A)** as applied above to claims 11-13 and 15, and further in view of Ohnishi et al. (US5730899).

Sano et al. fail to disclose the features recited in claims 17-24.

Ohnishi et al. teaches (col. 6, lines 28-32 and lines 50-54) the liquid crystal has a spiral pitch p in a range of $1\mu m<p<15\mu m$; and has an orientation twist angle θ in a range of $\theta \leq 300°$ for reducing view angle dependency of contrast of display color over wide temperature range.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify Sano Sano et al. in view of Tomio et al., Wakita et al., or Kobayashi et al and Ohe et al. liquid crystal display device with the liquid crystal has a spiral pitch p in a range of $1\mu m<p<15\mu m$ and has an orientation twist angle θ in a range of $\theta \leq 300°$ for reducing view angle dependency of contrast of display color over wide temperature range, as taught by Ohnishi et al. (abstract, and col. 2, lines 55-56 and col. 2, lines 64-65).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie-Huyen L. Ngo whose telephone number is (571) 272-2295. The examiner can normally be reached on M-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Julie-Huyen L. Ngo/
Primary Examiner
Art Unit 2871